

环境科学

用光助Fenton体系降解邻苯二甲酸二甲酯

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摘要:

利用几种不同的氧化体系对水溶液中的邻苯二甲酸二甲酯(DMP)进行光化学降解. 结果表明: 降解效率依次为:

UV/Fenton>UV/H<sub>2</sub>O<sub>2</sub>>无光Fenton >UV/Fe<sup>2+</sup>>UV>H<sub>2</sub>O<sub>2</sub>; 紫外光与Fenton体系之间存在协同效应; UV/Fenton体系是高效的降解体系; pH值、H<sub>2</sub>O<sub>2</sub>浓度、Fe<sup>2+</sup>浓度是光化学降解的重要影响因素, 各因素的重要性顺序为: pH值>H<sub>2</sub>O<sub>2</sub>浓度>Fe<sup>2+</sup>浓度; 正交实验确定适宜的降解条件为: 初始pH=3~4, Fe<sup>2+</sup>浓度为3.6×10<sup>-4</sup> ~ 7.2×10<sup>-4</sup> mol/L, H<sub>2</sub>O<sub>2</sub>浓度为1.9×10<sup>-2</sup> mol/L.

关键词: UV-Fenton法; 邻苯二甲酸二甲酯; 光降解

Photodegradation of Dimethyl Phthalate by UV-Fenton System

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Abstract:

The photochemical degradation of dimethyl phthalate(DMP) in aqueous solution was investigated via a comparative assessment in various advanced oxidation systems (UV, H<sub>2</sub>O<sub>2</sub>, UV/H<sub>2</sub>O<sub>2</sub>, UV/Fe<sup>2+</sup>, Fenton and UV/Fenton). The degradation trends followed the following order: UV/Fenton>UV/H<sub>2</sub>O<sub>2</sub>>dark/Fenton>UV/Fe<sup>2+</sup>>UV>H<sub>2</sub>O<sub>2</sub>. It could be inferred from the studies that UV radiation enhanced the removal rate of DMP in the Fenton process and UV/Fenton was the most effective for the decomposition of DMP. According to the experimental result, the concentrations of Fe<sup>2+</sup> and H<sub>2</sub>O<sub>2</sub> and pH value were the three main factors that could greatly influence the degradation rate of DMP, and the effect of the factors followed the order: pH value>H<sub>2</sub>O<sub>2</sub> concentration>Fe<sup>2+</sup> concentration. The optimum conditions were obtained by orthogonal experiment at initial pH=3—4 for the UV Fenton system, with original Fe<sup>2+</sup> and H<sub>2</sub>O<sub>2</sub> concentrations of 3.6×10<sup>-4</sup>—7.2×10<sup>-4</sup> mol/L and 1.9×10<sup>-2</sup> mol/L, respectively.

Keywords: UV-Fenton method dimethyl phthalate(DMP) photodeg

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